Pollution. Many issues, such as hydropower generation or navigation improvements, are worked out on a bilateral basis between Switzerland and the Federal Republic of Germany. Further, increasing progress is being made in co-operation at the subnational level between regional authorities in neighbouring countries for local issues. The Moselle and the Saar tributary basins are dealt with separately again by the tributary basin countries - France, the Federal Republic of Germany and Luxembourg for the Moselle; France and the Federal Republic of Germany for the Saar. These subbasin arrangements have simplified negotiations by reducing the number of participants to those countries which have the most interest in the issues at stake.

Where an international river is expected to reach a high degree of development and use, the basin countries should give early consideration to joint planning in order to avoid conflicting claims on the resource that may arise in the future

52. Disputes arise when demands on a common resource exceed the resource's capacity to meet them. In many cases, these types of disputes can be avoided by the basin countries if they compare the projected demands by each country on the river water. This will reveal the incompatibility of claims. Given time, joint plans can be drawn up to regulate the flow to increase the capacity for use, to apportion the waters, or to work out some other scheme to use equitably the shared resource without conflict.

53. Greece and Yugoslavia exchanged information for the Vardar-Axios and found that the plans for development of the resource were greater than the supply available. The incentive for co-operation became to avoid conflict over possible future water shortages. Integrated development of the river before the shortages occur will increase storage capacity and regulate the flow to meet the needs of both countries. Similarly, the impetus for the creation of the Niger Commission in the early 1960s came from the realization that projects being independently considered by Guinea, Mali and Nigeria would have adverse effects on major downstream projects by the 1990s.

## III. LESSONS FROM EXPERIENCE: INSTITUTIONAL ARRANGEMENTS TO FACILITATE JOINT ACTION ON THE MANAGEMENT AND DEVELOPMENT OF INTERNATIONAL WATER RESOURCES

54. Organizations concerned with the development and management of international water resources can be divided into three categories, namely: river basin agencies; national water resources organizations; and global and regional organizations. Experience has demonstrated that each of these categories of organizations can contribute in important ways to co-operative action with regard to the management and use of international rivers.

River basin organizations

55. Special international organizations have been established in many parts of the world to facilitate the management of international lakes and rivers. They perform many functions with varying degree of authority and effectiveness in promoting co-operative action. The International Commission for the Protection of the Rhine against Pollution has data-compiling duties and investigatory functions through its working group, but is limited in making recommendations by a unanimity rule. In contrast, the Central Commission for the Navigation of the Rhine has extensive approval authority over the construction of works on the river which may affect navigation and regulatory authority over the vessels which use the river. L'Organisation pour la mise en valeur du fleuve Sénégal (OMVS) has achieved impressive results and has authority over the development and management of the dams regulating the flow of river and port development and operation from the delta to Kayes in Mali. The Niger Commission, on the other hand, provides only a framework for negotiation between the nine basin States with few planning functions. The joint Yugoslav-Greek Commission for the Vardar-Axios River reviews the technical and planning studies of the Yugoslav, Greek and United Nations investigative team while the Co-ordinating Directorate for the investigation is responsible for the co-ordination of all activities. Ghana participates in both formal and informal arrangements with its neighbours. Through formal organizations such as the Ghana-Upper Volta Permanent Joint Commission for Co-operation and the Transport, Communications and Works Committee, planning for development of the Black Volta is co-ordinated. On an ad hoc basis the Volta River Authority (VRA) arranges for the distribution of surplus electricity from the Akosombo Dam in Ghana on the Volta with the Energie électrique de la Côte d'Ivoire (EECI), and with Togo and Benin, latterly through the Communaute d'électricité du Bénin (CEB). With a broader mandate the International Joint Commission (IJC) between Canada and the United States approves works on international rivers that affect water levels and water quality at the international boundary, carries out joint investigations and conducts public hearings at the request of the Governments and establishes technical boards such as the International Columbia River Engineering Board to plan integrated development or to handle special technical water management issues. The International Boundary and Water Commission between Mexico and the United States is responsible for works along the water boundary between the two countries.

56. Several conclusions emerge from the experience with river basin organizations in different parts of the world. These may be briefly summarized as follows.

(a) Communication among national representatives through meetings of river basin organizations can help build mutual trust and confidence among co-riparians.

(b) Development of an elaborate formal organization and procedure is not an important prerequisite for success.

It is important instead to design the organization in accord with prevailing political and economic realities found in the particular basin of concern. It is noteworthy that Ghana and its neighbours have through informal means developed good working relationships. Starting with

contacts between heads of departments and some fairly autonomous agencies such as the Volta River Authority of Ghana, technical findings, data and other information were exchanged which led to discussions of issues of common interest among technical personnel. Those discussions in turn helped in building up the mutual trust and understanding needed for negotiation and agreement on a political level.

(c) It is important that the river basin organization have a limited mandate and focus sharply upon issues of mutual interest.

The success of the informal negotiations of Ghana and its neighbours referred to above is attributed in large part to limiting discussion carefully to areas of mutual interest. The negligible accomplishments of the Organisation des Etas riverains du fleuve Sénégal (OERS) in comparison to the present OMVS resulted from too broad a mandate. The OERS sought, in conjunction with river basin development, extensive cultural, social and scientific co-operation. In comparison, the present OMVS more directly focuses its work on river basin development in which there are clear reciprocal benefits. Its success in comparison to its predecessor indicates the importance of designing institutional arrangements based on areas of common interest which are not so easily paralyzed by outstanding bilateral political issues.

(d) River basin organizations have been most effective when they have concentrated upon reaching agreement on the technical aspects of alternative schemes and have avoided efforts to resolve political issues.

This conclusion has two aspects. On the one hand, limiting an organization's responsibility to data collection and exchange does not realize the full potential of a commission. On the other hand, assigning responsibility to such an organization for the resolution of political issues will tend to limit the capability of the organization to deal effectively with important technical matters which must be dealt with to provide a basis for effective political action. Experience suggests that negotiations on political issues should be handled by national political representatives who specialize in such activities. This conclusion is well supported by the procedure followed in the case of the Columbia River Treaty. The International Joint Commission (United States and Canada) investigated and analysed the technical consequences of alternative development schemes. These analyses provided the basis for the political negotiations which were undertaken by a separate group.

## National organizations

57. Effective river basin management and development is dependent on the full commitment of the basin Governments. Water resource agencies and departments have the responsibility to create the conditions that enable the national political leaders to appreciate fully the opportunities and responsibilities for and constraints from joint use of development of an international river. If an international river basin organization exists, the relevant national organizations will undoubtedly be called upon to participate in its work.

58. The importance of the national organization to the success of co-operative efforts to manage international water resources cannot be over-stressed. As noted in the case studies in section II above, the willingness of a nation to co-operate in a joint endeavour will depend upon an assurance that it understands the consequences of alternative courses of action. For such understanding it must rely in the final analysis upon its own water resources agencies. Furthermore, it must have well equipped water resources agencies to participate in the implementation of programmes agreed upon.

59. Unfortunately many nations still do not have agencies with well trained staffs of sufficient size to discharge these responsibilities effectively. Thus a major objective of technical assistance by the international community must be to strengthen national agencies where the need exists, so that each nation can participate effectively in the investigation and analysis of alternative development and management schemes for international water resources systems.

## Global and regional organizations

60. This category includes the United Nations, its sister organizations and regional bodies such as the Organization of American States and the Council of Europe. These organizations have made three principal kinds of contributions: generation and dissemination of technical and legal information and provision of technical assistance, financing and training.

61. A report of the Secretary-General on international river basin development 2/ to the United Nations Committee on Natural Resources at its fourth session gives an overview of the activities in the field of the United Nations and related bodies, as well as several other global and regional organizations. Here it will suffice to give a few examples of the contributions made by various international organizations in each area of activity.

### Generation and dissemination of legal and technical information

62. The efforts of the United Nations system in the area have varied from the convening of panels of experts and seminars to the publication of various documents dealing with the technical, economic, legal and institutional aspects of international water resources development. Since the first symposium on Comprehensive River Basins Development was convened by the United Nations at Lake Success, New York, in 1949, the Secretariat has carried out an extensive programme of meetings and publications related or specifically oriented to international water resources.

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2/ "Water resources development: international river basin development: progress report of the Secretary-General on related activities" (E/C.7/46).

Two publications are especially worthy of mention: Integrated River Basin Development and Management of International Water Resources - Institutional and Legal Aspects. 3/ The United Nations Institute for Training and Research (UNITAR) and the Organization of American States have also contributed towards disseminating information in the general field of international rivers through various published reports. 4/

63. These types of publications are important because they provide useful guidelines on the technical and institutional issues on which attention should be concentrated, particularly in cases where the development of an international river basin is in the initial stages.

64. The United Nations system has also produced a number of documents dealing specifically with the legal aspects of management of shared water resources. The Secretariat has published a series of reference materials 5/ and the Food and Agriculture Organization of the United Nations (FAO) and the International Law Commission have reviewed bilateral and multilateral treaties and conventions relating to the uses of international water courses and published reports on the subject. 6/ These works provide one important type of input to further the development of legal principles for international river basin use. In this regard, mention should be made of the work currently being carried out by the United Nations Environment Programme (UNEP) on co-operation in the field of the environment concerning natural resources shared by two or more States, which promises to clarify many important questions concerning principles of conduct of States in international water resources development and management. 7/

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3/ United Nations publications, Sales Nos. E.70.II.A.4 and E.75.II.A.2

4/ See, for instance, International Navigable Waterways (United Nations publication, Sales No. E.75.XV.ST/6) and "Textos de documentos sobre el uso commercial de rios y lagos internacionales" (OEA/SER.I/VI.1.CIJ-97).

5/ Among the most important are "Legal problems relating to the utilization and use of international rivers" (A/5409), vols. I, II, III and Legislative Texts and Treaty Provisions concerning the Utilization of International Rivers for Other Purposes than Navigation (United Nations publication, Sales No. 63.V.4).

6/ For example, the "Law of International Water Resources", FAO Legislation Branch, Paper No. 1 (Rome, 1970) and reports of the International Law Commission on the work of its twenty-sixth and twenty-eighth sessions dealing with the law of the non-navigational uses of international water courses (A/9610, vol. II, and A/CN.4/L.249, chap. V, respectively).

7/ The Executive Director of UNEP has prepared for the Governing Council an informative document on the subject entitled "Draft principles of conduct for the guidance of States in the conservation and harmonious exploitation of natural resources shared by two or more States" (UNEP/IG.2/2).

Provision of technical assistance, financing and training

65. The United Nations Development Programme has financed and assisted in various ways other United Nations agencies and the Secretariat, as well as regional organizations, in executing development projects (a total of 30 up to January 1975) on a large number of international river basins. 8/ The executing organizations, such as the Centre for Natural Resources, Energy and Transport of the Department of Economic and Social Affairs of the United Nations Secretariat, FAO, United Nations Educational, Scientific and Cultural Organization, World Health Organization, World Meteorological Organization, the World Bank and regional organizations such as the Organization of American States and the Inter-American Development Bank, provide the technical support directly or supervise the work done either by individual experts or consultant firms. In addition, UNDP assists in the provision of fellowships abroad and training of local personnel during the execution of projects and arranges the delivery of all the equipment needed for project implementation. In several international rivers projects, UNDP, as the executing agency itself, provided the technical supervision services.

66. The World Bank already has a long experience in financing and assisting international rivers development projects. Over the 30 years of its life, the Bank has been involved in 29 projects dealing directly with the development of international rivers and river basins. In addition to providing capital funds and technical assistance, the World Bank has on several occasions, more conspicuously in the case of the Indus Basin, provided its good offices to assist in resolving disputes.

67. In general, therefore, these global and regional organizations have provided much needed technical and financial assistance in specific international river basins, which have not only aided the co-operating States in developing the information required to plan and assess potential development schemes but it has also helped to strengthen the technical capabilities of national organizations, particularly through training of national personnel to carry out these works by themselves, which is the ultimate goal of any aid programme.

## IV. CONCLUDING OBSERVATIONS

68. Several important conclusions emerge from the analysis of these experiences with international river basin co-operation. First, as has been previously emphasized, there is no substitute for the will to co-operate on the part of the co-riparian nations in each situation where a water resources system is shared by two or more nations. Without the will to co-operate little can be done to arrive at efficient and equitable management and use programmes.

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8/ For a complete list of technical assistance projects carried out by the United Nations system and several other global and regional organizations, see the document mentioned in foot-note 2.

69. Secondly, where the will to co-operate exists, it is of critical importance that each riparian nation understand fully what potential management and use schemes exist and what physical, economic and social consequences and uncertainties are associated with each scheme. For a State to acquire the information on which to base such understandings with full confidence that the information is reliable, it should have its own strong national water organizations on which to rely.

70. Thirdly, river basin organizations and procedures for exchanging data and resolving technical differences can be invaluable in building a foundation of mutual trust and confidence among the riparian States. Such a foundation provides a solid basis for the political negotiations that every agreement requires.

71. Fourthly, since in many cases an economic incentive does not exist to negotiate an efficient and equitable agreement regarding the management and use of international water resources, it is important to build a consensus on legal principles which should govern the development and use of such resources. Some general principles of global applicability could be developed based upon the experience accumulated in reaching bilateral, multilateral and regional agreements on management of shared water resources. In addition, in particular regions a set of regional principles is needed, such as those the Council of Europe is devising, to govern the control of pollution on international rivers in that region.

72. The foregoing points provide some guidelines on how the international community can be of greatest assistance in promoting agreements on the management and use of international water resources. In some situations, the possibility of creating regional training and information centres should be explored. In this way, the needs of groups of countries in specific technical fields, which they otherwise could not independently afford to create would be satisfied. It might also be useful to consider promoting an exchange of personnel engaged in international water resources management, both as a device to train management staff and as a means of sharing and disseminating experience in applying criteria and methods for the collection, storage, retrieval and standardization of basic basin data.

73. International organizations and individual nations could continue to publish technical information and provide technical assistance in investigating and planning specific programmes. This review suggests that the primary thrust of efforts of the international community could be towards the following:

(a) Providing technical and educational assistance to strengthen national water agencies so that each riparian nation engaged in an effort to achieve agreement on an international water resource will have a capable professional staff of adequate size on which to rely for technical investigations and analysis;

(b) Providing capital funds where such funds are urgently needed to implement an agreed-upon scheme of development and management for a specific international water resource system;

(c) Global organizations should seek to devise and foster consensus on principles of general applicability which should govern the management of international water resources, while each regional organization should try to promote consensus on principles that are particularly applicable within its region.

74. It is believed that vigorous pursuit of these activities will be of invaluable assistance to the riparian States involved in each situation which, in the final analysis, have the responsibility for negotiating and implementing the programmes to be undertaken.

Annex

SELECTED EXPERIENCES IN INTERNATIONAL INLAND WATER RESOURCES DEVELOPMENT AND MANAGEMENT

D. A. Caponera (Food and Agricultural Organization), "The Senegal basin"

N. Cordeiro (Organization of American States), "The Pilcomayo River basin"

G. Epler (Council of Europe), "Common water quality standards for international watercourses: an example of long-term regional co-operation"

A. B. Futa (Volta River Authority, Ghana), "The development of the Volta River: co-operation between co-basin countries"

F. L. Hotes (World Bank) and K. Guiness (Consultant to the World Bank), "Special considerations for World Bank projects on international waters"

A. C. Kiss (Centre national de la recherche scientifique, France), "Gestion et mise en valeur des eaux intérieures internationales: le Rhin

D. G. LeMarquand (Westwater Research Centre, Canada), "International development of the Columbia River"

C. Sepulveda (International lawyer, Mexico), "Una experiencia en la administración de aguas fluviales internacionales: El Rio Colorado como cuenca internacional"

P. Shallow (United Nations Development Programme), "Case study of the integrated development of the Vardar-Axios River basin"

T. U. Torti (Ministry of Finance and Development, Nigeria), "Key factors responsible for the planning, development, and management of the Niger international river basin in West Africa"

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